

Docket No. 277923US6DIV  
IN RE APPLICATION OF: Masayuki NISHIGUCHI, et al.  
SERIAL NO: 09/842,542  
FILED: April 26, 2001  
FOR: AUDIO SIGNAL REPRODUCING APPARATUS



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COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:  
Transmitted herewith is an amendment in the above-identified application.


- ☐ No additional fee is required
- ☐ Small entity status of this application under 37 C.F.R. §1.9 and §1.27 is claimed.
- ☒ Additional documents filed herewith: Request for Extension of Time (2 Months), IDS Transmittal, PTO-1449 (1); Cited References (13)

The Fee has been calculated as shown below:

CLAIMS	CLAIMS REMAINING		HIGHEST NUMBER PREVIOUSLY PAID	NO. EXTRA CLAIMS	RATE	CALCULATIONS
TOTAL	15	MINUS	20	0	x \$50 =	\$0.00
INDEPENDENT	3	MINUS	3	0	x \$200 =	\$0.00
		<input type="checkbox"/> MULTIPLE DEPENDENT CLAIMS			+ \$360 =	\$0.00
		TOTAL OF ABOVE CALCULATIONS				\$0.00
		<input type="checkbox"/> Reduction by 50% for filing by Small Entity				\$0.00
		<input type="checkbox"/> Recordation of Assignment			+ \$40 =	\$0.00
		TOTAL				\$0.00

- ☐ A check in the amount of \$0.00 is attached.
- ☒ Credit card payment form is attached to cover the fees in the amount of \$630.00
- ☒ Please charge any additional Fees for the papers being filed herewith and for which no check or credit card payment is enclosed herewith, or credit any overpayment to deposit Account No. 15-0030. A duplicate copy of this sheet is enclosed.
- ☒ If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time may be charged to Deposit Account No. 15-0030. A duplicate copy of this sheet is enclosed.

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

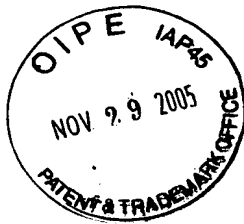
  
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(OSMMN 05/03)

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## Notification of Reason for Refusal

Patent Application No.

1-278209

JPO Examiner Teruhisa CHIBA

9568 5H00

Drafting Date: January 26, 1998

Dispatch Date: February 17, 1998

Agent / Applicant

Akira KOIKE (two other)

This application is refused for the reason mentioned below. If the applicant has any argument against the reason, such argument should be submitted within 60 days from the date on which this notification was dispatched.

### Reason

The invention in the claim noted below of the subject application is unpatentable under Patent Law Section 29(2) since it could have been easily made by persons who have common knowledge in the technical field to which the invention pertains, on the basis of the invention described in the publication below which was distributed prior to the filing of the subject application in Japan or other countries.

Note (The list of cited documents etc. is provided below)

Regarding the invention in claim 1: Cited document 1

Cited document 1 describes a headphone provided with a semiconductor memory having an audio signal recorded therein, and a decoder for decoding data recorded in the semiconductor memory. Accordingly, it is a known and conventional technology in the technical field to perform, in a recording/playback device using a digital memory, using a DAC to convert the data recorded in the memory and

outputting an analog signal. Thus, the invention in claim 1 of the subject application could have been easily made based on Cited document 1 and the above known conventional technology by persons skilled in the art.

List of cited documents etc.

1. Japanese Unexamined Patent Application Publication No. 62-31098

For the claim other than the claim specified in this notification of reason for refusal, no reason for refusal is found at present. If any reason(s) for refusal is found later, it will be notified.

法定期限日	事務所担当者
4/20	吉岡

# 拒絶理由通知書

S39313  
AM



ページ: 1

特許出願の番号

特願平 1-278209

特許庁審査官 千葉 輝久

9568 5H00

起案日 平成10年 1月26日

発送日 平成10年 2月17日

特許出願人代理人

小池 晃

(外 2名) 殿

この出願は、次の理由によって拒絶をすべきものである。これについて意見があれば、この通知書の発送の日から60日以内に意見書を提出されたい。

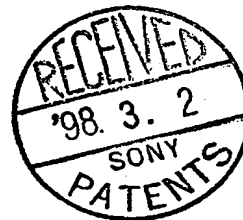
## 理 由

この出願の下記の請求項に係る発明は、その出願前日本国内又は外国において頒布された下記の刊行物に記載された発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第29条第2項の規定により特許を受けることができない。

記 (引用文献等については引用文献等一覧参照)

請求項1に係る発明について 引用文献1

引用文献1には、音声信号が記録された半導体メモリと、前記半導体メモリに記録されたデータを復号する復号器とを備えたヘッドフォンが記載されており、デジタルメモリを用いた録音再生装置において、メモリに記憶されたデータをDACによりアナログ信号に変換して出力することは、当該技術分野において周知である。



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小池 理  
539313 AM

ページ: 2

特許出願の番号

特願平 1-278209

平成10年 2月17日

知慣用の技術であることから、本願の請求項1に係る発明は、引用文献1及び上述周知慣用の技術に基づいて当業者が容易になし得たものである。

#### 引用文献等一覧

##### 1. 特開昭62-31098号公報

この拒絶理由通知書中で指摘した請求項以外の請求項に係る発明については、現時点では、拒絶の理由を発見しない。拒絶の理由が新たに発見された場合には拒絶の理由が通知される。

以 上

## Certified Copy of Decision of Refusal

Patent Application No.  
JPO Examiner Noriyuki MAEDA

1-278209  
9568 5H00

May 29, 1998

Title of the Invention	Audio Signal Playback Device
Applicant	Sony Corporation
Agent	Akira KOIKE (two other)

This patent application is refused for the reason described in the Notification of Reason for Refusal dated January 26, 1998.

The argument and amendment have been examined, but no basis sufficient to overthrow the reason for refusal has been found.

### Remark

The applicant submitted the argument against the Notification of Reason for Refusal, and, in the amendment, limited the constitution of the invention by the clause that the semiconductor memory is "provided in exchangeable form in the device".

However, in the technical field, providing the device with a semiconductor memory for recording an audio signal is only a known conventional technology, as can be seen by a microfilm of, for example, Japanese Unexamined Patent Application Publication No. 63-197100 or Japanese Utility Model Registration Application No. 62-158729 (see Japanese Unexamined Utility Model Application Publication No. 1-64700).

Therefore, the inventions in the claims of the subjection application could have been easily made based on

Cited document 1 (Japanese Unexamined Patent Application Publication No. 62-31098) and the above known conventional technology by persons skilled in the art.

In addition, in the argument, the applicant asserts that the invention described in Cited document 1 does not have any description of a configuration for recording an audio signal in a semiconductor memory by using high efficiency encoding.

However, since Cited document 1 describes an invention that uses delta-PCM to encode an audio signal, it is deemed that Cited document 1 describes an invention in which an audio signal is encoded by high efficiency encoding and is stored in a memory. (encoding of an audio signal by SBC or ATC is a known conventional technology in the technical field.)

Hence, it is deemed that the reason for refusal of the invention of the subject application has not been annulled yet.

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I certify that this copy is identical to the original.

Date of certification: June 23, 1998  
(Dispatch date)

Administrative Official of Ministry of International  
Trade and Industry: Takashi SATO (Official's Seal)

法定期限日	事務所担当者
7/23	吉 岡

拒絶査定 of 謄本

539313  
AM

ページ: 1

特許出願の番号

特願平 1-278209

特許庁審査官

前田 典之 ㊟

9568 5H00

平成10年 5月29日

発明の名称

オーディオ信号再生装置

特許出願人

ソニー株式会社

代理人

小池 晃

(外 2名)

この出願については、平成10年 1月26日付け拒絶理由通知書に記載した理由によって、拒絶査定する。

なお、意見書及び手続補正書の内容を検討したが、拒絶理由を覆すに足りる根拠が見いだせない。

備 考

出願人は、上記拒絶理由通知書に対して意見書を提出すると共に、手続補正書において半導体メモリを「本体に交換可能に設けられている」と発明の構成を限定している。

しかしながら、当該技術分野において音声信号を記録する半導体メモリを本体に交換可能に設けることは、例えば特開昭63-197100号公報或いは実願昭62-158729号のマイクロフィルム(実開平1-64700号公報参照)にみられるように周知慣用の技術にすぎない。

したがって、本願の請求項に係る発明は引用文献1(特開昭62-31098号公報)及び上述周知慣用の技術に基づいて当業者が容易になし得たものである

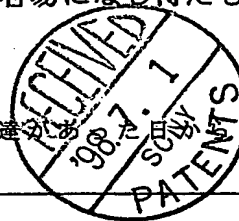
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なお、この査定に不服があるときは、この謄本の送達の日から30日以内に特許庁に審判を請求することができる。

この謄本は原本と相違しないことを認証する。

認証日 平成10年 6月23日  
(発送日)

通商産業事務官 佐藤 隆





続

葉

ページ： 2

特許出願の番号

特願平 1 - 2 7 8 2 0 9

平成 1 0 年 6 月 2 3 日

。また、出願人は意見書において引用文献 1 に記載の発明は音声信号を高能率圧縮符号化によって半導体メモリに記録する構成が記載されていないと主張している。

しかしながら、引用文献 1 には音声信号を  $\Delta$  PCM により符号化する発明が記載されていることから、音声信号を高能率圧縮符号化してメモリに記憶する発明が記載されていると認める。(なお、音声信号を SBC、ATC 等により符号化することは当該技術分野において周知慣用の技術である。)

よって、本願発明に対する拒絶の理由は依然として解消されないものと認める。

以 上

## Appeal Decision

Appeal Decision No. 1998-11057

7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo

Demandant

Sony Corporation

A.Koike & Co., 11th Mori Building, 2-6-4, Toranomom, Minato-ku, Tokyo

Agent, Patent Attorney

Akira KOIKE

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Agent, Patent Attorney

Eichi TAMURA

A.Koike & Co., 11th Mori Building, 2-6-4, Toranomom, Minato-ku, Tokyo

Agent, Patent Attorney

Seiji IGA

Regarding the Appeal Case [Japanese Unexamined Patent Application Publication No. 3-139700 opened to the public on June 13, 1991] against the Decision of Refusal of Japanese Patent Application No. 1-278209 "Audio Signal Playback Device", the following decision is made.

### Conclusion

The demand for appeal in this case does not hold.

### Reason

1. Particulars of Proceedings and the Subject Matter of the Invention in the Subject Application

The subject application was filed on October 25, 1989,

and, based on the description of the specification and drawings amended in the Amendment dated August 24, 1998, the inventions 1 and 2 (hereinafter referred to as "each claimed invention") in the subject application are identified as shown below, as set forth in claims 1 and 2 in the Claims of the specification.

"1. An audio-signal recording/playback device comprising:  
an analog/digital converter which converts an input analog audio signal into a digital signal;  
an encoding circuit which performs high efficiency compression encoding on the digital signal output from the analog/digital converter;

a semiconductor memory in which audio data output from the encoding circuit is stored; a decoding circuit which reads the audio data stored in the semiconductor memory and which performs decoding on the read data, the decoding being the inverse of the high efficiency compression encoding;

a digital/analog converter which converts a signal output from the decoding circuit into an analog signal; and

a headphone unit which is supplied with the audio signal in analog form from the digital/analog converter.

2. The audio-signal recording/playback device according to Claim 1, wherein the semiconductor memory is provided in exchangeable form."

## 2. Description in Cited Document

For the above claims, Japanese Unexamined Patent Application Publication No. 62-31098 (hereinafter referred to as the "cited document") cited in the reason for refusal in the original decision describes the following points.

(1) "A semiconductor recording-signal playback device having the shape of a hook-type earphone or a headphone and having an integrated combination of a socket or box including a semiconductor memory having an audio signal recorded therein, a small speaker which produces sound corresponding to an audio signal read from the semiconductor memory, a battery

which supplies a power-supply voltage to the semiconductor memory and the speaker, and an operating unit which controls signal playback from the semiconductor memory" (page 1, lower left column, lines 5 to 13)

(2) "Fig. 1a is a side view of a headphone 1R, and a ROM 4R indicates a state inserted into the device from a direction perpendicular to the sheet" (page 3, upper right column, lines 15 to 17)

### 3. Comparisons and Determination

Each claimed invention and the above cited document are compared with each other.

(i) The "semiconductor memory having an audio signal recorded therein" in the above item 2 (1) corresponds to the "semiconductor memory in which the audio data is recorded" in each claimed invention since the audio signal includes music (page 2, lower left column, line 10, page 2, lower right column, line 15).

(ii) The portions "having the shape of a hook-type earphone or a headphone and "having an integrated combination of a small speaker which produces sound corresponding to an audio signal read from the semiconductor memory and an operating unit which controls signal playback from the semiconductor memory" in the above item 2 (1) correspond to the "headphone unit which is supplied with an analog audio signal by reading analog data stored in the semiconductor memory".

(iii) The "socket or box including a semiconductor memory having an audio signal recorded therein" in the above item 2 (1) and Fig. 1 corresponding to the description of the above item 2 (2) correspond to the feature that "the semiconductor memory is provided in exchangeable form" in the invention in the claim 2 of the subject application since Fig. 1 shows a structure for mounting the semiconductor memory and it seems unlikely that the playback device is used for repeatedly listening to content stored in the same memory.

Thus, the inventions 1 and 2 in the subject application

are similar to the cited document in

"1. An audio signal playback device comprising a semiconductor memory for storing audio data, and a headphone unit which is supplied with an audio signal by reading the audio data stored in the semiconductor memory.

2. The audio signal playback device according to Claim 1, wherein the semiconductor memory is provided in exchangeable form.", and

the inventions 1 and 2 in the subject application and the cited document differ in the following points.

#### Differences

(a) The device in the cited document is a "semiconductor recording-signal playback device", and does not have any step, as in each claimed invention, of recording an audio signal in a semiconductor memory, and any circuits for the step, such as "an analog/digital converter and an encoding circuit which performs high efficiency compression encoding".

(b) In addition, the device in the cited document does not have, as a configuration for supplying audio data to a headphone in a playback step, any circuits such as "a decoding circuit which performs decoding that is the inverse of high efficiency compression encoding and a digital/analog converter which converts a signal output from the decoding circuit into an analog signal".

#### 4. Determination in this Appeal Case

The differences (a) and (b) are discussed below. In recording and playback of an audio signal in a semiconductor memory, "storing an audio signal in a semiconductor memory via an analog/digital converter and performing processing in a playback mode by using a circuit configuration that is the inverse of a circuit configuration for storing the audio signal" is unexceptional since it is a technology that can be commonly found in the technical field (see, for example, Japanese Unexamined Patent Application Publication Nos. 59-

174092, 62-187898, 59-72487 (semiconductor memories in the cited documents are also removable), etc.), and, the use of a similar technical configuration to perform "storing a signal in a semiconductor memory via an encoding circuit (after the signal is converted by an A/D converter) and implementing the inverse processing in a playback mode" is also well-known as a technology of information compressing corresponding to storage capacity (see, for example, a microfilm of Japanese Unexamined Utility Model Application No. 60-2817, a microfilm of Japanese Unexamined Utility Model Application No. 61-57308 (semiconductor memories in the cited documents are also removable), etc.). Accordingly, it is not considered that conceiving of the inventions 1 and 2 in the subject application by employing the above well-known points in the cited document requires special contriving and has particular difficulty. Hence, the conceiving of the inventions 1 and 2 in the subject application could have been easily reached by persons skilled in the art.

In this case, since the inventions 1 and 2 in the subject application have a description of performing the "high efficiency compression encoding" for encoding, what to be compared in high efficiency compression is slightly unclear. However, this processing itself is deemed as an arbitrary constituent point in the process of finding optimal conditions in an execution phase.

#### 5. Remark

Therefore, the inventions 1 and 2 in the subject application are unpatentable under Patent Law Section 29(2) because they could have been easily made by persons skilled in the art.

Accordingly, decision is made as stated in the Conclusion.

July 19, 2000

JPO Appeal Examiner Hiroshi EBATA, Appeal  
Examiner-in-chief

JPO Appeal Examiner Kei-ichi HASHIMOTO

JPO Appeal Examiner Masahiko KOIKE

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[Appeal Classification] P18 . 121-Z (G10L)

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I certify that the foregoing is identical to that recorded  
on the file.

Date of certification July 19, 2000

Appeal Clerk Mitsutoshi TATSUNO (Official Seal)

9/18

発送番号 052972 1/

審決

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平成10年審判第11057号



東京都品川区北品川6丁目7番35号  
請求人 ソニー株式会社

東京都港区虎ノ門2-6-4 第11森ビル 小池国際特許事務所  
代理人弁理士 小池 晃

東京都港区虎ノ門2丁目6番4号 第11森ビル 小池国際特許事務所  
代理人弁理士 田村 榮一

東京都港区虎ノ門2-6-4 第11森ビル11階 小池国際特許事務所  
代理人弁理士 伊賀 誠司



平成 1年特許願第278209号「オーディオ信号再生装置」拒絶査定  
に対する審判事件〔平成 3年 6月13日出願公開、特開平 3-139  
700〕について、次のとおり審決する。

#### 結 論

本件審判の請求は、成り立たない。



#### 理 由

##### 1. 手続の経緯・本願発明の要旨

本願は、平成1年10月25日の出願であって、その請求項に係る発明1

2. (以下「本願各発明」という。)は、平成10年4月20日及び平成  
10年8月24日付けの手続補正書により補正された明細書及び図面の記載  
からみて、その特許請求の範囲の請求項1. 2. に記載された次のとおりの  
ものと認める。

「1. 入力されたアナログのオーディオ信号をデジタル信号に変換するア  
ナログ／デジタル変換器と、

このアナログ／デジタル変換器から出力されたデジタル信号に高能率  
圧縮符号化処理を施す符号化回路と、

この符号化回路から出力されたオーディオデータが記憶される半導体メモ  
リと、この半導体メモリに記憶されたオーディオデータを読み出して上記符





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号化回路による高能率圧縮符号化処理の逆処理となる復号化処理を施す復号化回路と、

この復号化回路からの出力信号をアナログ信号に変換するデジタル／アナログ変換器と、

このデジタル／アナログ変換器からのアナログのオーディオ信号が供給されるヘッドホンユニットと

を有して成るオーディオ信号記録再生装置。

2. 上記半導体メモリは交換可能に設けられていることを特徴とする請求項1記載のオーディオ信号記録再生装置。」

## 2. 引用例の記載

これに対して、原査定の拒絶の理由に引用された特開昭62-31098号公報（以下「引用例」という。）には、下記の事項が記載されている。

（1）“音声信号の記録された半導体メモリを装備するソケットもしくはボックスと、上記半導体メモリより読出した音声信号を発音する小型のスピーカと、これら半導体メモリおよびスピーカに電源電圧を供給する電池及び、上記半導体メモリからの信号再生を制御する操作部を一体化し、耳かけ式イヤホンもしくはヘッドホンの形状に構成したことを特徴とする半導体式録音信号再生装置”（第1頁左下欄5行～13行）

（2）“第1図aはヘッドホン1Rを横から見た図で、ROM4Rは、紙面と直角方向から本体内に挿入した状態を示している”（第3頁右上欄15行～17行）

## 3. 対比・判断

本願各発明と上記引用例を比較する。

（イ）上記2.（1）で“音声信号の記録された半導体メモリ”は音声信号が曲を含むものであるから（第2頁左下欄10行、同頁右下欄15行）、本願各発明の「オーディオデータが記録されている半導体メモリ」に、

（ロ）同じく“半導体メモリより読出した音声信号を発音する小型のスピーカ”“半導体メモリからの信号再生を制御する操作部を一体化し、耳かけ式イヤホンもしくはヘッドホンの形状に構成”は「半導体メモリに記憶されたオーディオデータを読み出してオーディオ信号が供給されるヘッドホンユニット」に、

（ハ）上記2.（1）で“音声信号の記録された半導体メモリを装備するソケットもしくはボックス”、及び上記2.（2）の記載内容に対応した第1図には半導体メモリの装着構成があり、また再生装置は同じメモリに記憶された内容を繰り返して聞くことは考えられないから、本願発明2.の「半導体メモリは交換可能に設けられている」に、  
各々相当する。

審決  
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よって、本願発明1、2と引用例とは、

「1. オーディオデータが記憶される半導体メモリと、この半導体メモリに記憶されたオーディオデータを読み出してオーディオ信号が供給されるヘッドホンユニットとを有して成るオーディオ信号再生装置。

2. 上記半導体メモリは交換可能に設けられていることを特徴とする請求項1記載のオーディオ信号再生装置。」  
で一致し、以下の点で相違する。

#### 相違点

(a) 引用例のものは“半導体式録音信号再生装置”であり、本願各発明のようなオーディオ信号を半導体メモリに記録する工程はなくこれを構成する「アナログ／デジタル変換器、高能率圧縮符号化処理を施す符号化回路」等の回路を有していない点

(b) また、再生工程でオーディオデータをヘッドホンに供給する構成として「高能率圧縮符号化処理の逆処理である復号化処理を施す復号化回路と、この復号化回路からの出力信号をアナログ信号に変換するデジタル／アナログ変換器」等の回路を有していない点

#### 4. 当審の判断

上記相違点(a)(b)について検討するに、  
半導体メモリへのオーディオ信号記録再生において、

「オーディオ信号をアナログ／デジタル変換器を介して半導体メモリに記憶し、再生時その逆の回路構成で処理をする」ことは、当該分野ではごく普通に見られる技術であって格別のものでない(例：特開昭59-174092号公報、特開昭62-187898号公報、特開昭59-72487号公報(なお、該例示文献の半導体メモリは着脱自在でもある)等参照)、

また同様の技術構成で「(A/D変換器後に)符号化回路を介して半導体メモリに記憶し、再生時その逆処理をする」ことも記憶容量に対応した情報の圧縮技術として周知技術であるから(例：実願昭60-2817号のマイクロフィルム、実願昭61-57308号のマイクロフィルム(なお、該文献の半導体メモリは着脱自在でもある)等参照)、引用例に前記周知事項等を採用して本願発明1、2のようにすることは、このことで特段の技術的工夫を講じる必要のものとも、格別な困難性があるとも認められないから当業者が容易に想到できるものである。

この際に本願発明1、2は符号化に「高能率圧縮符号処理」する記載があり、高能率圧縮の比較対象が何であるのか不明瞭でなくもないが、この処理自体は実施段階で最適条件を探る過程で適宜な事項と認められる。

#### 5. むすび

したがって、本願発明1, 2は、上記引用例の発明の記載の内容に基づき  
当業者が容易に発明をすることができたものであるから、特許法第29条第  
2項の規定により特許を受けることができない。  
よって、結論のとおり審決する。

平成12年 7月19日

審判長	特許庁審判官	江島 博
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〔審決分類〕 P18 . 121-Z (G10L)

上記はファイルに記録されている事項と相違ないことを認証する。  
認証日 平成12年 7月19日 審判書記官 龍野 光利



- (11) Japanese Unexamined Utility Model Registration  
Application Publication No. 1-64700
- (43) Publication Date: April 25, 1989
- (21) Application No. 62-158729
- (22) Application Date: October 19, 1987
- (72) Inventor: Kunihiro ASAKINO
- (71) Applicant: Nippon Dry-Chemical Co., Ltd.

## SPECIFICATION

1. Title of the Invention: DIGITAL SOUND-RECORD/PLAYBACK  
DEVICE WITH IC CARD

2. Claim of Unexamined Utility Model Registration  
Application

A digital sound-record/playback device for an IC card,  
the device having: a connection section for detachably  
attaching an IC card including a ROM, EPROM, OTROM, One-Time  
ROM, or RAM; and an interface for digital sound-  
record/playback for the IC card.

3. Detailed Description of the Invention  
(Industrial Applicability)

The present invention relates to a device for  
performing record/playback to/from an IC card including a  
ROM, EPROM, OTROM, One-Time ROM, or RAM.

(Related Art)

While sound record/playback devices typically employ a  
system in which a recording tape based on analog, digital or  
the like is rotated to perform record/playback, an IC-card-  
specific sound-record/playback device has not been developed.

(Problems to be Solved by the Invention)

Recently, a system that includes an IC memory to which  
digital-sound record or playback is performed thereto or  
therefrom has been put to practical use. However, the

memory capacity is considerably increased due to the audio analysis/synthesis characteristics, and thus actual recording time is short compared to typical tape-type devices. Such a system, however, has some advantages. For example, it does not have a mechanical section such as a rotation section, the card itself is compact and portable, and access to the beginning of a desired audio sequence can be freely and instantly performed by controlling an address. Accordingly, the system is used for alarm systems, in-room systems, security systems, and so on. However, since IC cards are designed specially for those systems, the scope of application is limited. The number of recordable phrases is also small and thus the expandability is also limited. For recording to a RAM, the user may inadvertently carry out a wrong operation to thereby cause recorded sound to be erased in an instant.

(Means for Solving the Problems)

The present invention solves such problems and provides a digital sound-record/playback device that is used with an IC card and that can be used for various purposes.

FIG. 1 shows a circuit related to an interface for digital sound-record/playback for an IC card.

A sound-record section includes a microphone, a sampling unit, a data compression processing unit, and an audio synthesizing unit.

Audio input through the microphone is sampled at an appropriate sampling frequency (e.g., 16 KHz) in accordance with a required sound-quality level and is then subjected to signal processing and data compression. As one example, an ADPCM (Adaptable Pulse Code Modulation) system is employed to record sound to an IC card. While the memory capacity of the IC card varies depending on sound-recording time, recording of 64 seconds at 250 Kbytes is possible with 8 KHz sampling ADPCM.

A playback section retrieves audio data digitally recorded in memory of the IC card, synthesizes audio, then enhances the sound quality through filtering, further amplifies the audio, and outputs the audio to a speaker.

The above-described sound-record and playback are performed using operation switches.

The sound-record/playback device is equipped with an IC card insertion slot that allows easy attachment and detachment of the IC card, operation push buttons, and so on. Without requiring additional provision of a mechanical structure, the sound-record/playback device can be configured with only an electrical circuit including an IC substrate and so on.

As the IC card, one having a circuit with a ROM, EPROM, RAM, OTRAM, One-Time ROM, or the like is used.

(Advantages of the Invention)

With the digital sound-record/playback device with an IC card according to the present invention, operations of inserting the IC card into the insertion slot to establish connection and merely pressing an operation button can easily perform sound-record/playback. Unlike a tape system, since there is no mechanical structure, the device is less likely to break down. Further, when a significantly compact device is realized, the scope of application can be extended in the future.

#### 4. Brief Description of the Drawing

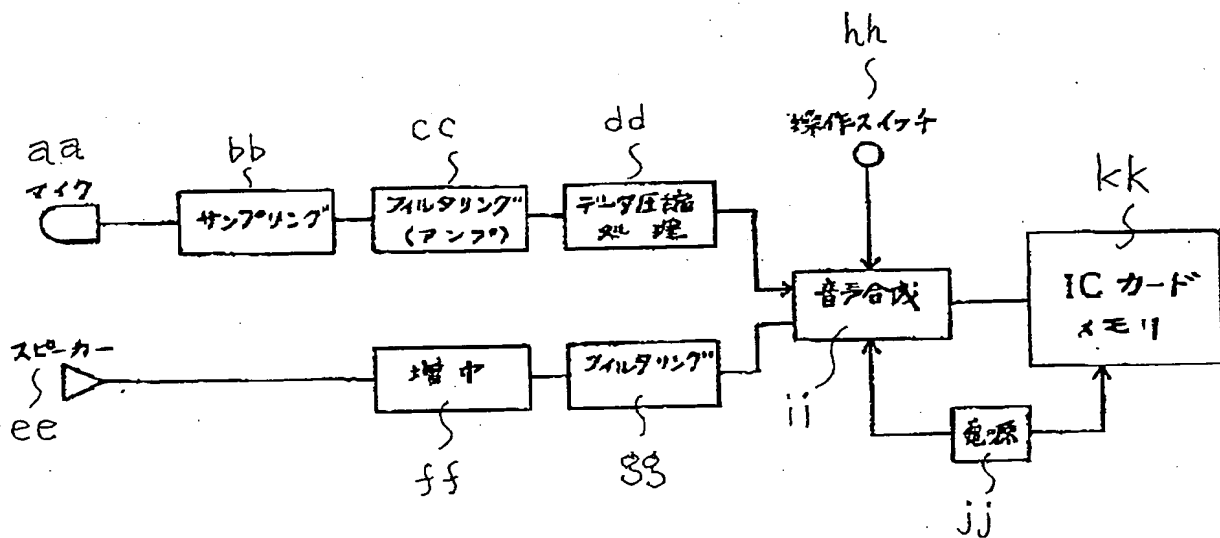
FIG. 1 is a block diagram of the circuit of a sound-record/playback of the present invention.



FIG. 1

aa MICROPHONE  
bb SAMPLING  
cc FILTERING (AMPLIFIER)  
dd DATA COMPRESSION PROCESSING  
ee SPEAKER  
ff AMPLIFYING  
gg FILTERING  
hh OPERATION SWITCH  
ii AUDIO SYNTHESIZING  
jj POWER SUPPLY  
kk IC CARD MEMORY

# 第 1 図



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